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J. ORTIZ ECHAGÜE

BASQUE FISHWIVES OF ORIO, SPAIN, MOUNT A RAMP TOWARD TOWN TO SELL THEIR WARES

Each carries her husband's portion of the catch. Fish nets hang over the railing to dry. Orio hugs the Bay of Biscay coast near the French border, again officially opened. (Bulletin No. 5).

Bulletin No. 1, March 8, 1948

Army Moves HQ to Undamaged Heidelberg

GI'S WHO surged eastward with General Patch's Seventh Army in the spring of 1945 will have no trouble recalling Heidelberg, now the new headquarters of the U. S. Army European Command. It was the one sizable German city undamaged by bombing.

Seat of Germany's oldest university (1386), Heidelberg was spared by RAF and AAF even as England's Oxford and Cambridge escaped the Luftwaffe's fury.

Setting for "The Student Prince"

Tourists flocking to Heidelberg in peacetime admire the crumbling medieval castle which rises on a fir-clad bluff behind the town. Built to grandeur in the 12th and 13th centuries, its return to dust was hastened by men of Louis XIV, and by lightning. Heidelberg's World War II ruins, however, consist only of bridges blasted by retreating Germans (illustration, next page).

This is the same Heidelberg that ranks as a gay and friendly place with thousands of Americans who have never been east of Jones Beach, Long Island. To them, Heidelberg is where the tuneful and democratic Student Prince of operetta fame took seminars in fencing, stein-singing, and love-making.

A city of 80,000 in 1939, Heidelberg has become much more crowded since the war's end due to the influx of uprooted thousands from eastern Germany. It stretches for two miles along the sheltered, verdant valley on the south bank of the Neckar River. A dozen miles northwest, near Mannheim, the Neckar joins the Rhine. Fifty airline miles north, battered industrial Frankfurt has now become the headquarters for the British and American Bizonia.

Heidelberg University, glorified by Mark Twain and Longfellow as well as by Sigmund Romberg, lies at the city's heart. Landmarks among its buildings, severely plain in architecture, are the library of 900,000 volumes and the student prison.

Fencing Corps Center of Social Life

Women comprised one-fourth of the university's prewar enrollment. The school finally closed its doors shortly before Heidelberg was taken by American forces. The medical department was the first unit to reopen after the war.

Lacking dormitories, the students live in rooming houses. Social life revolves traditionally around the five rival fencing corps, each with its distinctive cap and color. Facial scars long were regarded as badges of honor.

The buildings of the crumbling, moated castle are grouped around a central courtyard much in the manner of small English villages. In the ancient cellar visitors may see the "Heidelberg tun," an enormous cask

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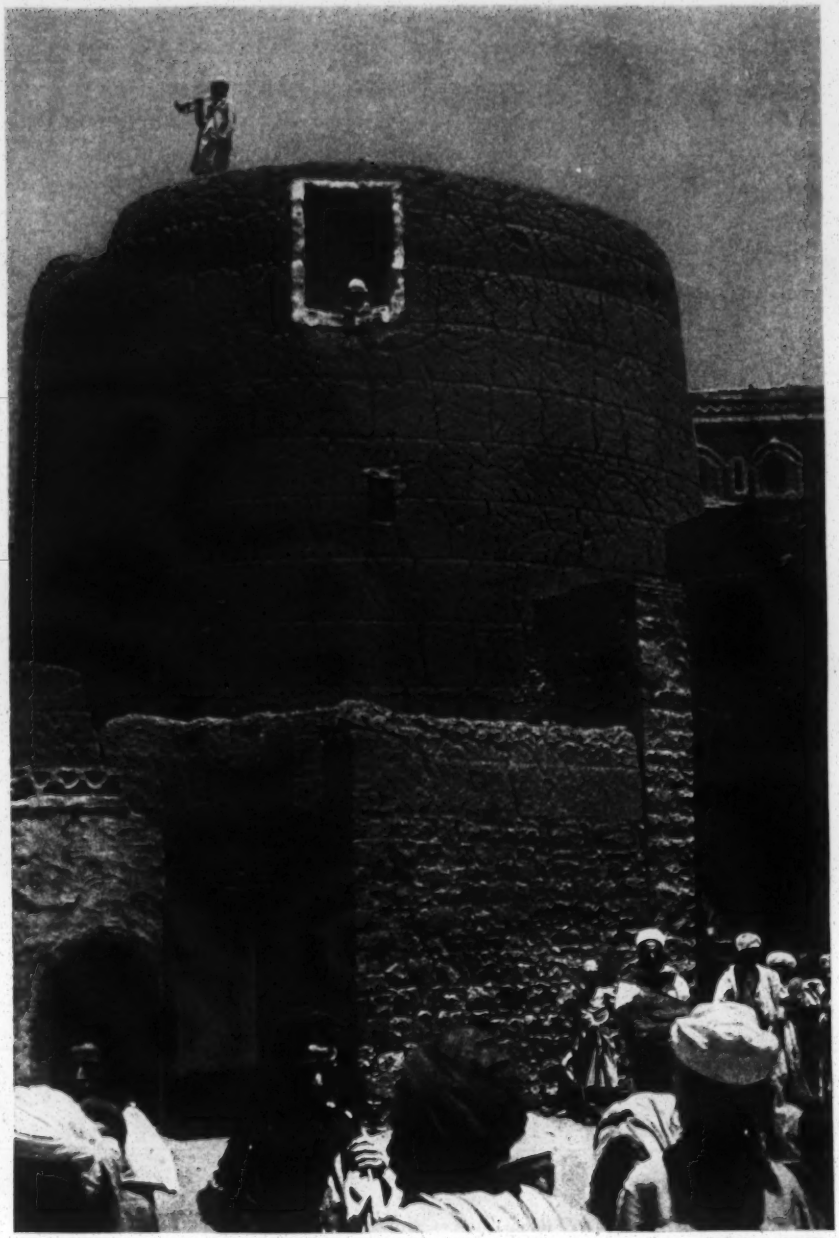

RICHARD H. SANGER

CRACKED WITH AGE BUT DURABLE, A MUD TOWER COMMANDS ONE OF THE GATES TO SAN'A

The capital of Yemen, a Tibet-like land in the southwest corner of the Arabian Peninsula, is a walled city whose walls are still used (Bulletin No. 3). All eight gates are closed at sundown and opened during the night only by direct order of the Imam. This absolute ruler each Friday proceeds with Oriental pomp from his palace to the royal mosque. The bugler on the tower is calling the Imam's guard—2,000 strong—to their posts for the weekly parade.

Volcanic Azores Are Sea and Air Crossroads

THE AZORES, where a United States military base is to continue under a new agreement with Portugal, have served traffic between the New and Old worlds from the days of sailing ships to the air age.

Portugal's nine volcanic outposts, upthrust darkly from the vast expanse of the Atlantic, are known as the "Islands of the Hawks," from the Portuguese word Açores. Equally appropriate are other titles applied to the archipelago: "midway house of the Atlantic," "crossroads of sea and air," and "Western Islands."

U. S. Air Base near Heart of Islands

At Santa Maria, 900 miles west of Portugal, Columbus stopped in 1493 on his return from his first voyage to the New World with the epic story of his discovery. During World War II, the United States and Britain established stations on Terceira and Santa Maria which helped win the Battle of the Atlantic.

The airfield where United States military base rights will continue is at Lagens on Terceira. This island is in the heart of the scattered Azores. It is about 2,400 miles east and a little south of New York City. The gateway to the Mediterranean lies some 1,200 miles to the east of Lagens. The base at Mellaha, near Tripoli in North Africa, which the United States has recently reopened, is a little more than 2,300 miles away.

In the Azores, airplanes roar above dirt roads where slow-moving oxen (illustration, next page) still carry much of the traffic. A familiar sound is the wail of the "singing carts," so called because their wooden wheels cry aloud for grease. There is an island joke to the effect that the noise tells the driver whether or not he is moving.

The volcanic formation of the islands shows in the rugged crests of craters, some of them extinct, others occasionally active. These rear massive heads against deep-blue skies. Fences of lava rock divide the land into fertile grainfields, luxuriant orchards, vineyards, and green meadows where cattle graze.

Early Explorers Staked Claim for Portugal

In the cities as well as in the villages, houses are built of lava with whitewashed walls and roofs of bright-colored tiles. Big lava-rock chimneys, rising above sloping roofs like small penthouses, are outlets for the huge ovens where the family baking is done.

The islands, which have a population of nearly 500,000, are ruled as an integral part of Portugal. They were acquired by that nation in the 15th century when Portuguese explorers were sailing unknown seas and planting their flag in distant lands.

For purposes of government, the Azores are divided into three groups, each sending representatives to the chamber of deputies in Lisbon. The chief seaport of each group is capital of its district. Ponta Delgada, metropolis of the islands, on São Miguel, is capital of the easternmost district. Recent census figures place its population at 21,000. Next in

built two centuries ago. The last unit of the castle to be built was a beautiful palace in the style of the Italian Renaissance. Frederick V erected it at the beginning of the 17th century for the pleasure of his queen, Elizabeth, granddaughter of Mary Queen of Scots.

The Neckar River is perhaps second only to the Rhine in German legend and song. In recent years it has been canalized so that standard Rhine barges of 1,200-ton capacity can ascend the river far past Heidelberg and almost to Stuttgart, Germany's prewar automobile center.

If ambitious engineering plans prevail, the Rhine and the Danube will be joined via the Neckar and a 37-mile canal through the Swabian Alps between Ploechingen and Ulm.

NOTE: Heidelberg may be located on the National Geographic Society's map of Germany and Its Approaches. Write the Society's headquarters, Washington 6, D. C., for a price list of maps.

See also, "What I Saw Across the Rhine," in the *National Geographic Magazine* for January, 1947; "War's Wake in the Rhineland," July, 1945*; and "Rediscovering the Rhine," July, 1925. *(Issues marked with an asterisk are included on a special list of Magazines available to teachers in packets of ten for $1.00.)*

FREDERIC LEWIS

SAVED BY ITS UNIVERSITY, HEIDELBERG IS AN UNDAMAGED HQ FOR U. S. OCCUPATION FORCES

Wedged between castle-crowned heights and the swift-flowing Neckar, Heidelberg is a ribbon of a town. Its main street angles and curves its entire length. The spire of the Holy Ghost Church (left) towers over roofs of buildings that crowd between it and the river. Bridges lead to roads winding up the Heiligenberg (right). Also on the far side of the Neckar stands the tavern where student duels took place, and the outdoor cafe, traditionally the original of a scene in "The Student Prince."

Bulletin No. 3, March 8, 1948

San'a Skyscraper Capital of Ancient Yemen

CONFLICTING rumors attending the death of the octogenarian Imam Yahya of Yemen have directed attention toward one of the world's least-known capitals. San'a, from which the Arab priest-king ruled his Red Sea domain, rises from a fertile inland plateau visited in all history by only a handful of outsiders. Pending arrival of the mission, no foreign country currently had representation there.

But ancient San'a buildings pile skyward with the "modern" look of American skyscrapers (illustration, next page). Actually San'a had skyscrapers before the time of Jesus, higher than its present ones.

City Wall Still Used

Reaching up to seven stories high, today's buildings, with their colored-glass windows, are massed together like apartment houses. Tall minarets and mosque domes cut the skyline. A truly modern addition is a radio tower, which, with its station, was a gift from the United States.

Yet San'a is one of the most medieval of cities. It is surrounded by a high octagonal brick wall, with many semicircular bastions (illustration, inside cover). The wall symbolizes long isolation. To enter any of the eight massive gates is to dispel any impression of modernity which a distant view of the buildings might give. Strictly speaking, there are no streets—just uneven earth packed by centuries of traffic.

No foreigner is permitted to enter this holy city of 48 mosques and 39 synagogues without permission of the ruling imam (king). In fact, travelers may not come to Yemen without royal consent. No hotels are strung along the roads; official guesthouses lodge government visitors.

In the two-story stone guesthouses at San'a, concessions have been made to European customs by providing chairs and tables, instead of having guests sit Oriental fashion on Persian rugs. It even has electric lights, which are virtually unknown elsewhere in Yemen.

For the most part, there are no modern conveniences or public utilities in this city of 50,000 people. The water supply, coming largely from the newer part of the city, is drawn by camels or oxen from wells 60 feet deep.

Imam Yahya an Absolute Ruler

Through a gate in the city wall, the newer city connects with the shopping center in the old town to the east. The near-by palace of the king housed a hospital behind its thick walls during Turkish occupation.

From his palace, the imam rules over the temporal and spiritual life of his estimated 4,000,000 subjects. He has no throne but sits at a desk, where no citizen is too lowly to consult him. He dispenses justice under a tree at the palace gates. Yemenis accept his word as the law of Allah.

Yahya succeeded to power in 1904. His 44-year sway was a record before his death. The nucleus of his kingdom is a fertile valley, 100 miles long, about 80 miles inland from and parallel to the Red Sea coast, and 7,000 feet above the sea. San'a and several cities nearly as large occupy this valley, the most productive part of the Arabian Peninsula. Farmers grow

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size is Angra do Heroismo, on Terceira. Horta, on Fayal, the third district capital, was the landing place of the U. S. Navy plane NC-4, which took off from Newfoundland in 1919 to make the first successful transatlantic flight. Twenty years later, Horta—also the meeting point for transatlantic cables—became a regular stop on the commercial air route between the United States and Europe.

At Flores, westernmost of the islands, the English fleet lay before the battle immortalized by Tennyson in his poem, "The *Revenge*." Reputed to be the most beautiful of the Azores, Flores was named for the masses of roses, camellias, gladioli, wisteria, hydrangeas, and countless other flowers which spring from its fertile volcanic soil.

Before the era of airplanes and ocean liners, gold and silver galleons, windjammers, whalers, and graceful clipper ships brought the islands trade and wealth. Modern steamships carry from them tea, oranges, pineapples, and wine; embroidery made by the skillful fingers of the women of Terceira; lace from Horta, and pottery from Santa Maria.

NOTE: The Azores are shown on the Society's map of the Atlantic Ocean.

For additional information, see "American Airmen in the Azores" (10 color photographs), in the *National Geographic Magazine* for February, 1946; and "European Outpost: The Azores," January, 1935.

WILHELM TOBIEN

THROUGH THE STREETS OF PONTA DELGADA, OXEN ROLL OUT THE BARRELS OF WINE

Carters of Ponta Delgada transport barrels of wine underslung between the wheels. By this labor-saving device, barrels need be lifted only a few inches instead of several feet. They narrowly escape the pavement as carts creak along. Wine is made on several of the Azores, in whose volcanic soil vineyards flourish. Iron balconies (right) echo Mediterranean architecture seen in Lisbon streets.

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Bulletin No. 4, March 8, 1948

Eclipse Observations to Correct Map Errors

ONE of the most ambitious and extensive eclipse operations ever attempted is getting under way this month as 30 scientists and technicians leave the United States for the Far East and the Aleutians.

The National Geographic Society is sponsoring the far-flung expeditions. Dr. Gilbert Grosvenor, President of the Society, has announced that the scientists will split into teams and set up seven camps in six countries along a sweeping arc of 5,320 miles (map, next page).

Hope to Answer Question of Earth's Size and Shape

Though widely separated, the seven observation sites will be closely co-ordinated and will act as a technical unit on eclipse day—May 8-9, 1948. The double date results from the fact that the eclipse path crosses the International Date Line. For the teams west of the date line, in Burma, Siam, China, Korea, and Japan, the eclipse will fall on May 9. For the two Aleutian teams, May 8 will be the date.

By accurately timing and photographing the eclipse at the different camps and then comparing notes, the scientists hope to answer a "$64 question": What is the precise size and shape of the earth? This problem, which has puzzled mankind for 2,500 years, has never been answered with complete accuracy.

Consequently, all maps have been slightly incorrect. Given a reasonable break on the weather, the May eclipse findings are expected to pinpoint relative positions of the earth's surface within 150 feet or less, greatly improving map making. On present maps, certain points are off by several hundred feet to a mile in relation to other points.

The coming eclipse is called an "annular" eclipse. The moon will appear slightly smaller than the sun. When the moon moves in front of the sun a ring or "annulus" of light is visible around the moon. This differs from a total eclipse in which the moon completely covers the sun.

Eclipse to Be Photographed on Sound Film

Scientists of the expedition will measure with great precision the times of "contact" between the edges of the sun and moon during the eclipse—that is, when their edges appear to touch as the moon moves across the face of the sun.

These contact times will be measured by photographing the eclipse on 35-millimeter sound-motion-picture film. The one-per-second ticks of a chronometer will be recorded on the sound track. Radio time signals will be used to check the accuracy of the chronometers. A comparison of the eclipse contact pictures with the time marks on the sound track alongside them will indicate the exact moment of the contacts.

The contacts will come at different times at the various observing stations along the eclipse path. Knowing the difference in the time of the contacts as measured by any two stations, it will be possible to calculate with great accuracy the distance between these two stations, and to locate their relative positions on the earth's surface with only a negligible

grains, coffee, bananas, oranges, grapes, and a narcotic shrub called kat.

Kat-chewing is the national pastime of Yemen. The people—young and old—rip the leaves from the plant *(Catha edulis)* and chew them for afternoon relaxation.

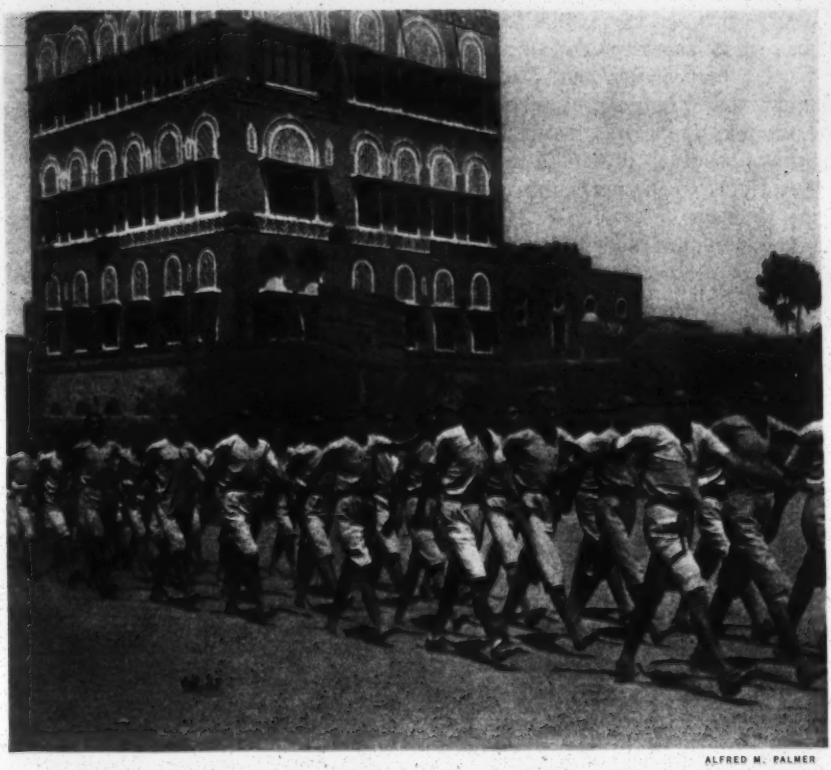
Arab ponies provide fast travel. Camels do most of the pack work, carrying exports to Yemen's Red Sea port of Hodeida. Mocha, the port of coffee fame, has declined.

Yemen roads, until recently, discouraged automobile traffic. But in the spring of 1946, United States missions drove by jeep and army truck from Aden, British port south of Yemen, and Hodeida to San'a. A treaty of friendship and commerce was drawn up and the two countries for the first time agreed to exchange diplomatic representatives. Preceding the members of the missions, only seven Americans are believed ever to have entered Yemen.

NOTE: Yemen is shown on the Society's map of Asia and Adjacent Areas.

For further information, see "Yemen—Southern Arabia's Mountain Wonderland," in the *National Geographic Magazine* for November, 1947.

See also, in the GEOGRAPHIC SCHOOL BULLETINS, April 1, 1946, "Yemen Follows Saudi Arabia in Discarding Forbidden-Land Rule."



ALFRED M. PALMER

SCHOOL'S OUT! ORDERLY BUT HIGH-STEPPING SAN'A BOYS SWING ACROSS THE DUSTY YARD

Yahya, the late Imam of Yemen, had improved education in his capital by providing schooling for 8,000 children, mostly boys. A few hundred girls are educated in small separate schools. Many of the boys are orphans or sons of chieftains and officials from outlying districts of the Arab kingdom.

Bulletin No. 5, March 8, 1948

France-Spain Border Follows Lofty Pyrenees

THE reopening of the French-Spanish border at the Pyrenees officially unlocks the gateways of a rugged mountain region through which have passed kings and smugglers, sight-seers, business men, political refugees, and soldiers of fortune.

Except for the western and eastern extremes where the range dips to sea level, and for a few of the more accessible central passes, the Pyrenees raise a lofty barrier against traffic between the Iberian Peninsula and the rest of Europe.

Smuggling a Skilled Profession

The ranges march for 250 airline miles from sea to sea, between the Bay of Biscay and the Mediterranean Sea. Etched against the blue like medieval castles, their barren and precipitous peaks reach upward for two or more miles. Their highest point is Mt. Aneto (Nethou), which soars to 11,168 feet.

Smuggling has been a skilled profession in the Pyrenees from time immemorial. As recently as last August, a news story from Hendaye, France, reported a strike by the "smugglers' union" against the guards' laxity in allowing residents to slip across the border for scarce goods, thus depriving the smuggling brethren of business.

After a two-year shutdown, the resumption of regular communications promises new life for towns on both sides of the frontier.

One small border-straddling settlement, Le Perthus, has been cut in two by the international line along its main street. Strictly rationed Frenchmen, wishing to buy in the well-stocked Spanish stores across the street, have had to win concessions from the authorities or confine themselves to window-shopping.

Normal trade in such Spanish goods as oranges, shoes, and pyrites, exchanged for French wheat, machines, and phosphates, moves along the chief land routes clinging to the western and eastern coasts. Passengers and freight are transferred at the border because of Spain's wider gauge.

Andorra Lies Athwart Boundary

The western trunk railway runs through the French resort town of Hendaye to near-by Spanish Irún and other Basque towns with their quaint architecture and customs (illustration, cover). In the east, steel rails link old Perpignan, which now has one of France's most modern cold-storage plants, with Spain's important northeast port of Barcelona.

Between the coasts, a few minor railways and automobile roads reach or cut across the Pyrenees' "storm of hills." But most of the routes are high, narrow trails worn by the plodding of hardy mountaineers seeking greener pastures for goat and sheep herds. A few such trails lead through tiny Andorra (illustration, next page), an independent country perched on the mountaintops between France and Spain.

Broad or narrow, snow-packed or framed by summer gentians and blue bells, the passes of the Pyrenees have echoed to the martial tramp

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error. These data in turn can be used to determine very accurately the shape and size of the earth.

Another result of the expedition's observations will be "tying together" the triangulation networks of the various countries in which the observing stations are located. A triangulation network is a survey of a given area in which distances between points are accurately measured.

To tie various networks together, it is necessary to measure precisely the distances between points in any two networks, but many nations have not yet been linked up in this way. This has been due partly to the difficulty of extending triangulation networks across oceans.

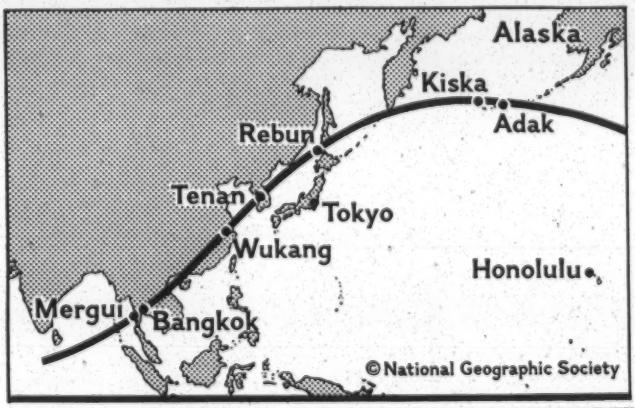
Linking up as many national networks as possible to form a world-wide network is considered highly desirable in the making of more accurate maps of the world as a whole.

Co-operating with the National Geographic Society in the project will be the U. S. Army's Map Service, Corps of Engineers, and Signal Corps; the Navy, Air Force, Bureau of Standards, Coast and Geodetic Survey, and State Department. Members of the Society's Foreign Staff will "cover" the observation stations with photographs and story.

Two of the scientists, Dr. George Van Biesbroeck of Yerkes Observatory and the Reverend Francis J. Heyden of Georgetown College Observatory, were members of the National Geographic Society-U. S. Air Force Expedition which observed the total eclipse of May 20, 1947, in Brazil.

A Japanese observer will supervise the Japanese station—one of the first occasions since the end of World War II when a Japanese scientist has co-operated with Americans in a research project.

NOTE: See also, "Eclipse Hunting in Brazil's Ranchland," in the *National Geographic Magazine*, Sept., 1947; and "Your Society Observes Eclipse in Brazil," May, 1947.



LIKE A GREAT CIRCLE AIR ROUTE, THE MAY ECLIPSE WILL CUT AN ARC FROM BURMA TO ALASKA

On the path are shown the seven positions from which the eclipse will be observed by scientists of the project sponsored by the National Geographic Society. From Tokyo the Society's co-ordinator will direct the multiple operation, one of the most ambitious projects in the long history of eclipse observation.

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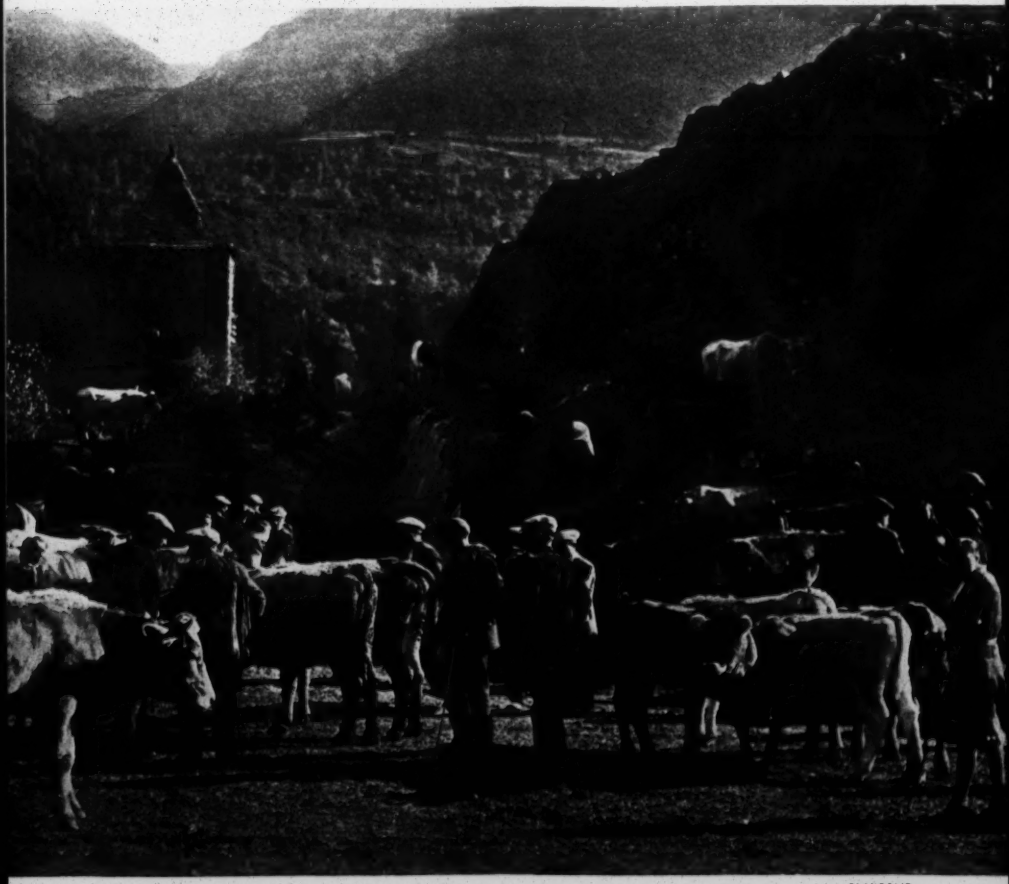
of the armies of Hannibal, of Charlemagne marching against the Moors, and of Napoleon fighting Wellington for the Iberian Peninsula.

Near the end of the Spanish civil war (1936-39), refugees fled across the wintry mountains into France. During World War II, a reverse stream of fugitives from German domination escaped across the Pyrenees by the "underground railway" which also helped many Allied airmen reach safety after bailing out or crashing in enemy territory.

NOTE: The French-Spanish border region is shown on the Society's map of Central Europe and the Mediterranean.

For additional information, see "A Skyline Drive in the Pyrenees" (with 24 color photographs), in the *National Geographic Magazine* for October, 1937*; "Turbulent Spain," October, 1936; and "A Palette from Spain," March, 1936.

See also, in the GEOGRAPHIC SCHOOL BULLETINS, April 1, 1946, "Natural Barrier of Pyrenees Separates Spain from France."



PLANDOLIT

GRAZING AND HERDING HAVE SUPPLANTED SMUGGLING AS THE CHIEF ANDORRAN OCCUPATION

The mountaineers of this Pyrenees land tend the herds and flocks that are driven up to their lofty pastures every summer from adjoining France and Spain. These animals are gathered for a cattle fair, several of which are held every fall before the drive back to home pastures. Formerly, even the best families took advantage of Andorra's position between two large countries to turn an honest penny by smuggling silks, phosphorus, matches, perfumery, tobacco, and livestock across the borders.